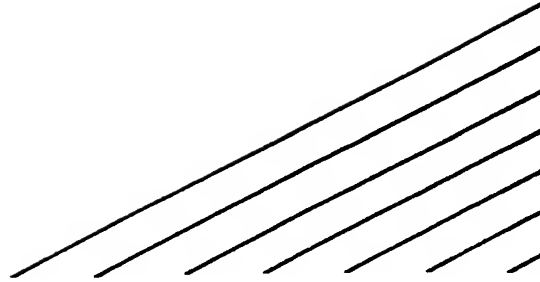


APPENDIX B

NORAND
DATA SYSTEMS



**3000 Series
Radio Data Terminal**

**USER'S
GUIDE**

NPN: 961-047-017
July, 1990

**3000 SERIES
RADIO DATA
TERMINAL**

**User's Guide
NPN 961-047-017**



Norand Corporation
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Cedar Rapids, Iowa 52401
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3000 SERIES RADIO DATA TERMINAL

User's Guide

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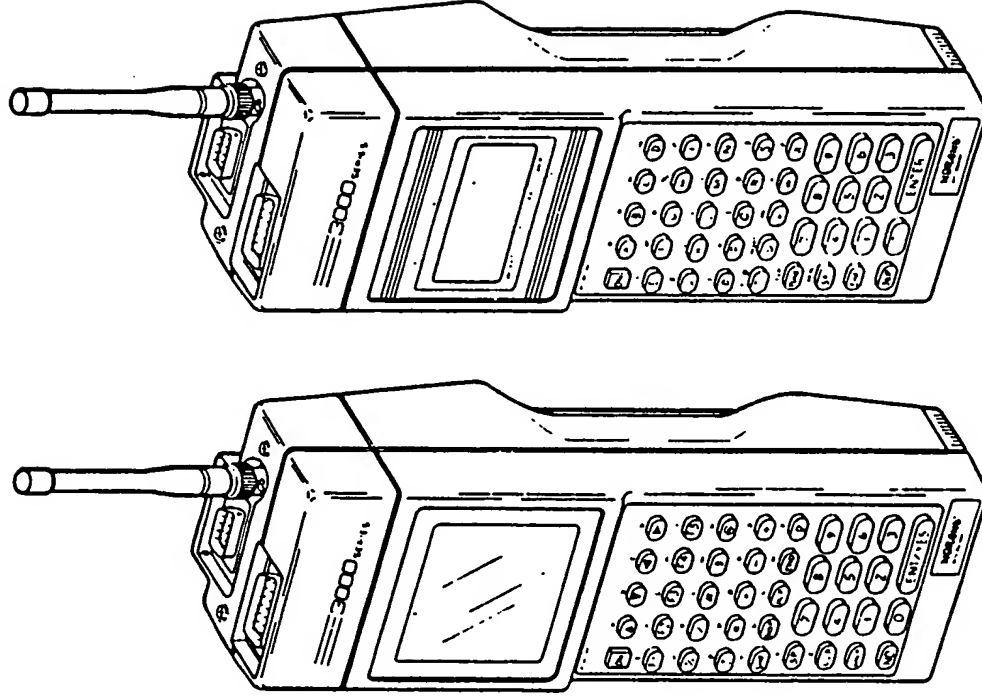
NOTICE

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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SECTION ONE GENERAL INFORMATION

INTRODUCTION

This user's guide contains instructions on setting-up, operating, and maintaining the NORAND® 3000 Series Radio Data Terminals. The 3000 series terminals include the RT3310 Radio Data Terminal and RT3410 Radio Data Terminal. The guide is divided into three sections: General Information, Terminal Operation, and Maintenance and Troubleshooting. Appendices (located at the rear of the manual) contain the terminal specifications and terminal menu flowcharts.

The General Information section contains an overview of this manual, instructions on unpacking and inspecting your terminal, and a description of the terminal components.

The Terminal Operation section contains instructions on preparing the terminal for operation and how to operate your RT3310 or RT3410 Radio Data Terminal. The instructions in this section assume your terminal has one of the basic firmware packages (operating programs) offered with the RT3310 or RT3410. If your company has purchased custom firmware, some of the instructions and procedures offered here may not apply to your terminal.

The Maintenance and Troubleshooting section describes the care and maintenance required to ensure trouble-free operation. The maintenance part of this section explains how to clean the terminal, what steps should be taken if liquid is accidentally spilled on the terminal, and the procedures for removing and replacing various user-replaceable parts on the terminal. In the event of a terminal malfunction, perform the troubleshooting procedures in this section before you contact your Norand representative. This may eliminate a needless site visit or the unnecessary return of a functioning unit to your authorized Norand RF service center.

Appendix A contains the equipment specifications for the 3000 series terminals, detailing the physical and operational characteristics of both terminal styles (RT3310 and RT3410). Appendix B contains the Terminal Menu Flowcharts. The Terminal Menu Flowcharts show all of the menus which are permanently stored in the terminals and

which can be opened or viewed by the user. The menus are shown in top-down order and the flowcharts can be used to determine which menus you must open first to get to a particular screen.

GENERAL INFORMATION

UNPACKING AND INSPECTING

The following procedures explain what to do when you receive your terminal, and what procedures you should take if the terminal has been damaged in shipping.

1. Remove the terminal from its shipping container and inspect the terminal for obvious signs of damage.

NOTE

Terminals are inspected in our factory prior to shipment and should be received in new condition.

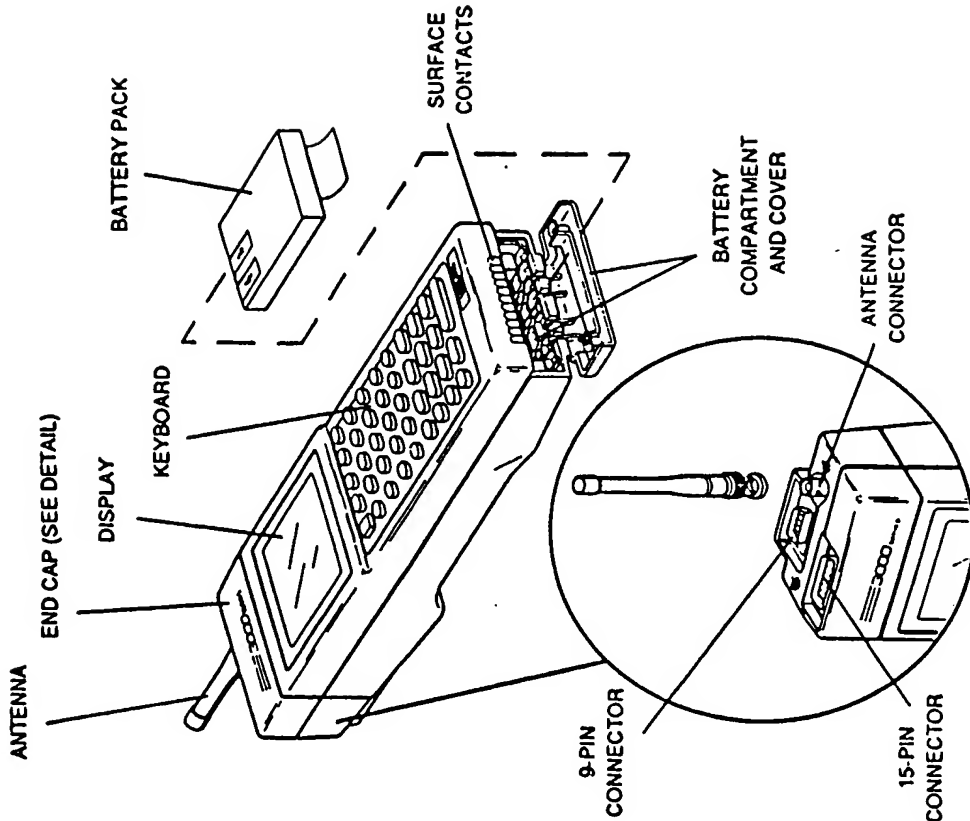
2. If any damage was incurred during shipping, note the serial number of the damaged unit(s) and save any paperwork pertaining to the shipment (bill of lading, invoice, etc.). Immediately notify the transport company of the damaged items and follow their instructions for filing a claim.

NOTE

Damaged or defective terminals can only be serviced at the designated Norand (RF) Customer Support Center for your region, as shown on the Norand Customer Support Center wall chart included with your shipment.

TERMINAL DESCRIPTION

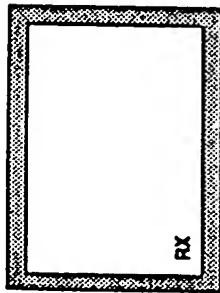
The following paragraphs describe the various components (and their functions) on your RT3310 or RT3410 Radio Data Terminal. Refer to figure 2 for the exact location of each component described.



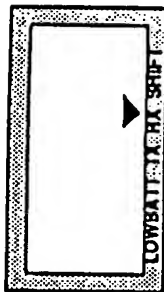
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Figure 2
Terminal Components

- RX Indicates the terminal is receiving data.

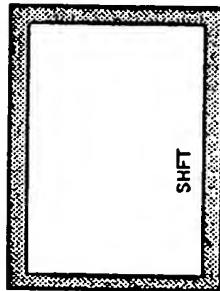


RT3410 Display



RT3310D Display

- SHIFT or SHIFT (128X128 or 4-line display, respectively) Indicates the terminal keyboard is in the shift mode.

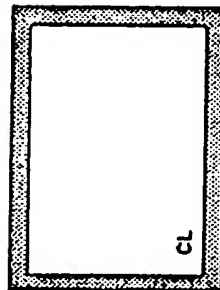


RT3410 Display

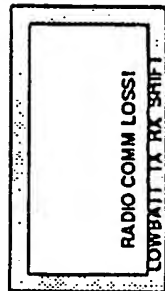


RT3310 Display

- CL or RADIO COMM LOSS! (128X128 or 4-line display, respectively) Indicates RF communication link with the base radio has been lost. The operator must reestablish communications to continue.



RT3410 Display



RT3310 Display

Display Backlight

The electroluminescent backlighting on both displays is for use in low light conditions. Backlighting is toggled on and off by pressing the key with a graphic symbol of a light bulb (on terminals with firmware package FWP301K5), or by pressing the SHF key followed by the key with a graphic symbol of a light bulb (on terminals with firmware package FWP301C5). After a keyboard-programmable period of terminal inactivity, the backlight automatically turns off to conserve battery power. It is automatically restored if a key is pressed, a good scan is detected, or a displayed message is received from the host computer.

Terminal Keyboard

The keyboards used on the RT3310 and RT3410 are firmware specific—that is, each standard firmware package has its own unique keyboard. Each keyboard contains 40 color-coded alphanumeric keys (including the ON key) and an overlay containing various alphanumeric and graphic symbols representing the key functions when the terminal is in the shift or function modes of operation. The keyboards are shown in figures 3 and 4. Refer to your programmers guide for a description of the various key functions.

Terminal End Cap

The terminal end cap contains the antenna connector, a 15-pin connector, and a 9-pin connector.

CAUTION

All peripheral devices attached to the 15-pin or 9-pin connectors on the terminal end cap must have or use shielded cables. Shielded cables will prevent possible damage to the peripheral device from induced energy caused by the terminal antenna. *All cables and peripheral devices sold by Norand are shielded, however, devices obtained from sources other than Norand may not be so protected.*

The antenna connector is a BNC type connector which, when properly mated with the connector on the base of the antenna, complements the mechanical and electrical connections between the terminal and the antenna.

The 15-pin connector is a D-size subminiature (D-sub) connector. It can be used to attach a NORAND® NC122 Power Supply/Charger to the terminal (to recharge the terminal battery pack), or it can be used as an RS232 level communications interface with other compatible devices.

The 9-pin connector is also a D-sub connector. It is used exclusively as an interface between the terminal and 5-volt barcode scanning devices.

Antenna

The antenna is used in conjunction with the radio data terminal to transmit and receive data. The antenna can be removed and replaced by the user if necessary (refer to the **MAINTENANCE AND TROUBLESHOOTING** SECTION).

Surface Contacts

The surface contacts perform a function similar to the 15-pin D-sub connector on the terminal end cap. The contacts are positioned so they will be aligned with, and touching, similar contacts in a NORAND 3950 or 3960 Dock Charger, when the terminal is properly installed in either of these devices. When the terminal is installed in a dock charger, the surface contacts provide an RS232 level communications interface and a power input to charge the terminal battery pack.

Battery Compartment and Cover

The battery compartment is used to house the battery pack. The battery compartment cover is a hinged device which, when closed and latched, ensures the battery pack remains in position.

Battery Pack

The battery pack is made of rechargeable Nickel-Cadmium (Nicaid) cells which are joined together and then sealed in a shrink-wrap case. When the battery pack is fully and properly installed in the

terminal, the two metallic contacts on the top of the battery pack touch four contacts located in the battery compartment, completing the electrical path between the battery pack and the radio data terminal.

Handstrap

The handstrap (not shown) is a user-replaceable elastic band located on the back of the terminal. When using the radio data terminal, the operator's hand goes between the terminal and the handstrap. The handstrap will then rest snug against the operators hand, allowing him/her to occasionally relax their grip on the terminal without fear of the terminal slipping from the hand. After repeated use, the handstrap may lose its elasticity or become worn, and should be replaced. Refer to the **MAINTENANCE AND TROUBLESHOOTING** SECTION for instructions on replacing the terminal handstrap.

SECTION TWO

TERMINAL OPERATION

INTRODUCTION

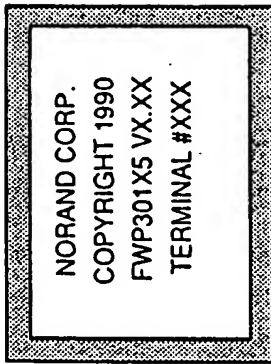
This section contains instructions on how to prepare, set-up and operate your RT3310 or RT3410 Radio Data Terminal. In most cases, specific set-up and operating instructions are dependent upon your system software and the operational parameters programmed into the terminal.

The instructions in this section are based on the two standard operating programs (firmware) available for RT3000 series terminals. If your terminal has custom firmware, some set-up procedures contained in this section may not apply to your particular terminal. Set-up procedures for terminals with custom firmware will be covered in the training or application manuals you receive with your system.

If you are not sure, you can determine which firmware package your terminal is using by one of the following methods (the two standard firmware packages are identified by the codes FWP301C5 or FWP301K5):

- Compare the keyboard on your terminal to the keyboards shown in figures 3 and 4 (in Section One). If the keyboard on your terminal is the same as the keyboard shown in figure 3, the firmware package in your terminal is FWP301C5. If your keyboard is the same as the one shown in figure 4, the firmware package in your terminal is FWP301K5.
- Look at the label located under the handstrap attached to the back of the terminal. This label contains the Norand part number for the terminal (after the letters PN) and the identification code for the firmware package contained in the terminal (after the letters PR). In addition, after the firmware identification code will be the version number for that particular firmware package (for example, 1.2).

- Turn the terminal on. After the terminal completes a power-up self test, the display will show a screen similar to the following:



The X's in the above display will be letters or numbers representing the firmware package and version installed in the terminal and the current number assigned as the terminal address.

PREPARING THE TERMINAL FOR OPERATION

The following procedures explain how to prepare a new RT3310 or RT3410 Radio Data Terminal (or a terminal which has been in storage) for operation. Included are instructions for installing and charging the battery pack. The battery pack can be charged outside the terminal, in a device specifically designed for this purpose, or it can be installed in the terminal and then charged. (Refer to the paragraph titled Battery Pack Characteristics in Appendix A for a list of devices which can be used for charging the battery pack). Instructions for charging the battery pack when removed from the terminal are included with the device used for this purpose. Instructions for in-terminal charging of the battery pack immediately follow the battery installation procedures. *These instructions pertain to all 3000 series terminals, regardless of their firmware package, unless otherwise noted.*

Battery Pack Installation Procedures

The battery pack is removed from the terminal for shipping, and should be removed from the terminal prior to long-term storage (over 30 days). The following instructions explain how to install the battery pack in the terminal.

1. Refer to figure 5. Release the cover on the terminal battery compartment by turning the two latching screws 1/4 turn towards the outside of the terminal (use a flathead screwdriver or small coin to turn latching screws).

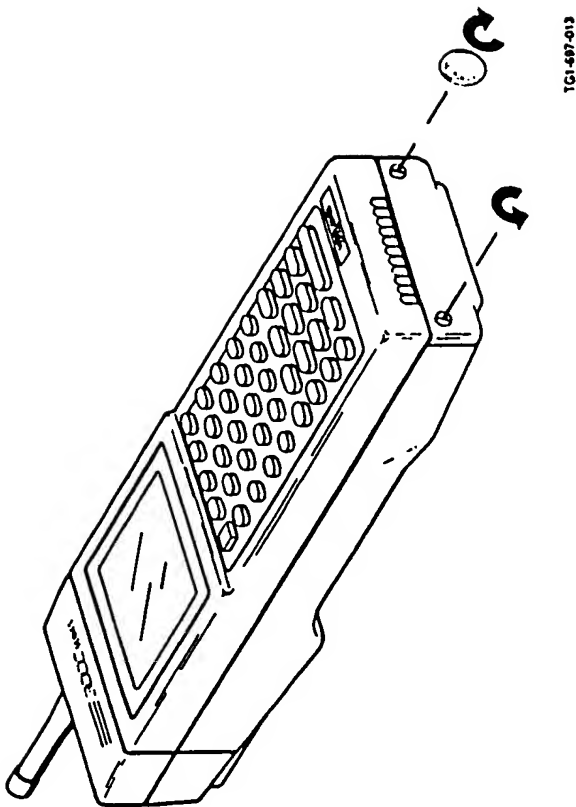
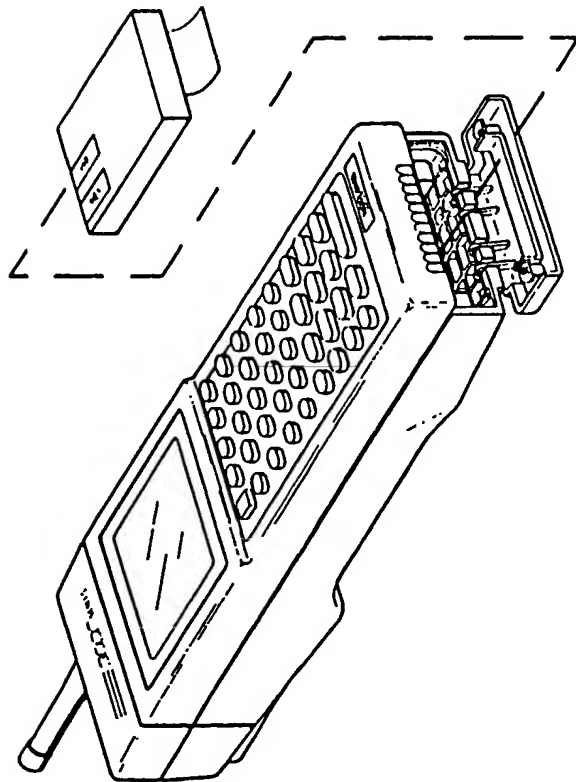


Figure 5
Opening the Battery Compartment Cover

2. Swing the battery compartment cover downward to expose the battery compartment.
3. Refer to figure 6. Insert the battery pack into the battery compartment. When properly installed, the two metal contacts on the battery pack will face up (towards the keyboard side of the terminal) and will be located towards the front of the battery compartment (the end closest to the terminal antenna).
4. Close the battery compartment cover and latch cover into place by turning the two latching screw 1/4 turn towards the inside of the terminal.



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Figure 6
Installing the Battery Pack

In-Terminal Battery Pack Charging Procedures

NOTE

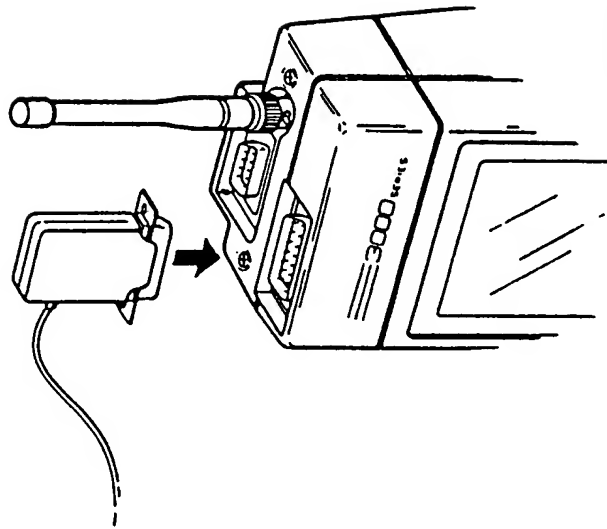
In-terminal battery charging requires approximately twelve (12) hours to complete one charge cycle. The battery pack must complete one charge cycle prior to being used for the first time. In addition, the battery pack should be recharged at the end of each operating session or whenever the low battery indication is present on the terminal display.

There are two ways to accomplish in-terminal charging of your battery pack. The first is by applying charge power through the surface contacts located on the bottom of your terminal and the second is by applying charge power through the 15-pin connector located on the top of the terminal. In either case, the following procedures should be used:

1. Attach a NORAND® NC122 (or equivalent) charging device to the 15-pin connector on the top of the terminal (refer to figure 7), or place the terminal in a Norand dock charger (models 3950 or 3960) (refer to figure 8).
2. Apply charge power to the terminal (refer to the documentation you received with your charging device for specific instructions on how to operate the device).
3. Turn your terminal on by momentarily pressing the ON key (on the terminal keyboard).

NOTE

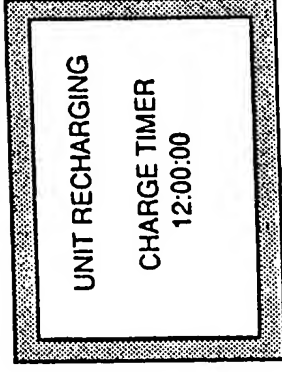
If you fail to turn your terminal on, the charge power applied to the terminal battery pack will be at a reduced rate and will result in insufficiently charged batteries at the end of the charge cycle.



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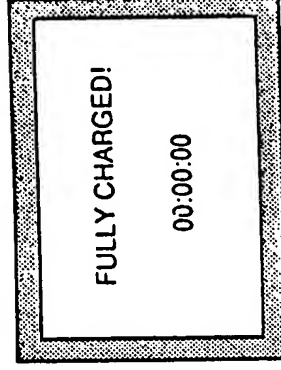
Figure 7
Attaching the NC122 Power Supply/Charger to the Terminal

During the in-terminal charge cycle the display on your RT3310 or RT3410 will show the following message:



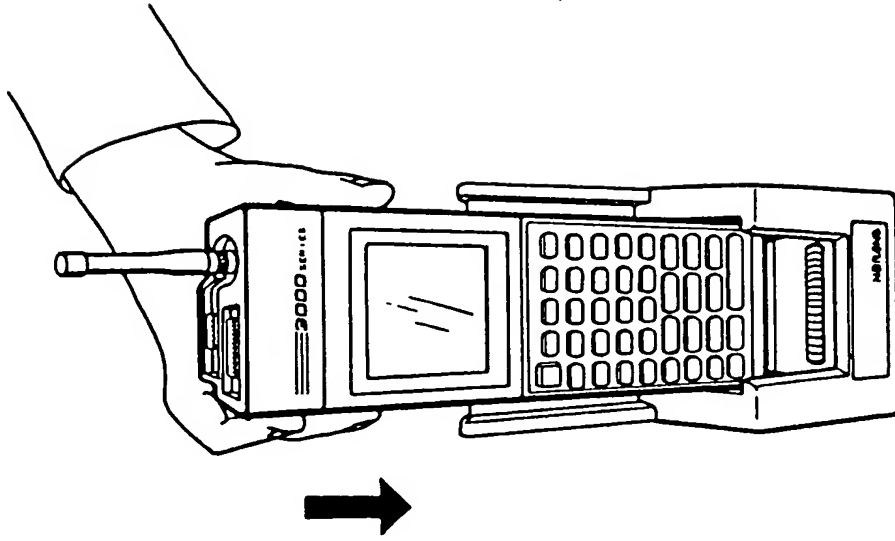
The time shown after CHARGE TIMER is the amount of time left in the charge cycle.

When the charge cycle is complete, the display message will change to the following:



At the end of the charge cycle the charge power applied to the terminal battery pack is automatically reduced to prevent overcharging the batteries.

Once you have a fully charged battery pack installed in your terminal, you must set the operational parameters of the terminal before it can be used in the network.



TC1-400-012

Figure 8
Placing the Terminal in a Dock Charger

4. To exit from the VERSION INFO menu, press the ENTER key one time. The terminal display will return to the MAIN MENU.

Opening the TEST ROUTINES menu

The TEST ROUTINES menu is primarily for the use of Norand service technicians as an aid in diagnosing problems in terminals returned for service. User accessible menus (and instructions on opening them) are covered in the Maintenance section of this manual.

TERMINAL INSTALLATION

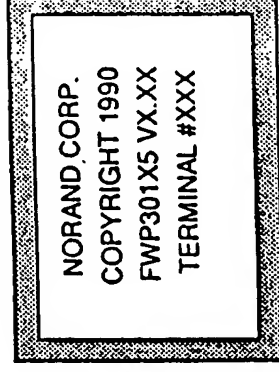
There are no special procedures for installing the RT3000 Series Radio Data Terminals in a network. If the components of your radio data network have been properly installed (refer to the various installation manuals you received with these components), your system software is installed and operating on your host computer, and you have programmed the operational parameters in your terminal(s), your network should be operational. All that is required to begin data collection is enabling the terminal (from the host), and turning the terminal on.

TERMINAL OPERATION

The following paragraphs contain general information and instructions on operating your 3000 Series Radio Data Terminal. Specific procedures, dependent on your network hardware, software, and the operational parameters you have programmed into your terminals, will be provided in the training session(s) you receive with your system.

Turning the terminal on

Turn the terminal on by pressing and releasing the ON key, located on the terminal keyboard. Each time it is turned on, the terminal performs a "power-up" self-test, then the beeper sounds three times and the display will read:



NOTE

The X's in the above display represent the terminal's firmware package (FWP301[C or K]5), the version number of the firmware package (after V), and the number assigned as the terminal address (after #).

Operation of the terminal after it has been turned on depends primarily on the software package controlling your network. Data is normally entered into the terminal through the keyboard or from a barcode scanner.

Turning the terminal off

Turn the terminal off by pressing the terminal ON key until the terminal display goes blank. The terminal will usually turn off within 5-seconds, but may take as long as 8-seconds.

Attaching a barcode reader to the terminal

Your RT3000 series terminal, when enabled by the host computer, can be connected to a variety of 5-volt barcode readers (scanners). The barcode reader will allow the terminal to read and interpret any active (enabled) barcode labels (refer to 2) BARCODE PARAMS, in the paragraph SETTING THE OPERATIONAL PARAMETERS OF THE TERMINAL).

The barcode reader is attached to the terminal at the 9-pin connector located on the terminal end cap. When a scanner is properly attached to an enabled terminal, the terminal will provide the power and control signals necessary for proper scanner operation. Refer to

the documentation you received with your barcode scanner for specific instructions on operating the device.

Attaching other peripheral devices to the terminal

There are a variety of devices and accessories which can be used with your RT3310 or RT3410 Radio Data Terminal. Instructions on attaching and using these devices are included with the equipment.

SECTION THREE MAINTENANCE AND TROUBLESHOOTING

INTRODUCTION

This section contains the maintenance and troubleshooting procedures for the 3000 Series Radio Data Terminals.

The maintenance procedures include instructions on cleaning the terminal, removing and replacing the handstrap, and removing and replacing the antenna.

The troubleshooting procedures consist of several common problems you may encounter when using a radio data terminal, along with steps you can take if the problem is ever encountered. In many cases, it is difficult to determine if a problem is due to a faulty terminal or some other component of the network. The troubleshooting procedures will help you isolate a problem to its source and may, in some cases, enable you to correct the malfunction.

TERMINAL MAINTENANCE

Your radio data terminal is a precision-crafted, highly technical device that has been designed to withstand the rigors of daily operation in the retail environment. However, the terminal does require occasional maintenance to ensure continued trouble-free operation. The following paragraphs include maintenance procedures you may be required to perform to keep your terminal in good working order.

CAUTION

Under no circumstances are you authorized to open the sealed case of the RT3310 or RT3410 Radio Data Terminal. These terminals contain electronic components which are highly susceptible to damage from electrostatic discharge (ESD) (commonly called static electricity). The terminal case is designed and sealed to protect these components from the static charges found in most environments. Special precautions must be taken before the case is opened, and special equipment and tools must be used to prevent damaging these components.

the terminal. It may be necessary to repeat this step several times to clean especially dirty terminals or areas of terminals.

2. Use a clean cloth dampened with *clean water* to wipe the outside surfaces of the terminal to remove soap residue left from step 1.

Terminal Handstrap Maintenance

The elastic handstrap on the back of the RT3310 and RT3410 is designed to hold the terminal snug in the hand of user. This feature allows the operator to relax his/her grip on the terminal without fear of dropping it. After repeated use, the elasticity of the handstrap may begin to diminish or the handstrap may become worn. In either case, the handstrap should be replaced. Replacement handstraps are available from Norand (Norand Part Number NPN 753-962-001), and can be easily installed using a phillips-head screwdriver.

The following steps explain how to remove and replace the elastic handstrap.

1. Place the terminal on a clean level surface, with the keyboard/display side *down*. A soft cloth or other material should be placed between the terminal and the work surface to prevent scratching or otherwise damaging the terminal.
2. Refer to figure 9. Use a phillips-head screwdriver to remove the two screws on both handstrap retainer pads.

3. Lift-up and remove the two retainer pads, then remove and discard the old handstrap.

4. Lay the new handstrap (NPN 753-962-001) in place on the terminal, with the smooth sides of the metal eyelets (on either end of the handstrap) facing away from the terminal. The eyelets slip over the plastic protrusions on the rear of the terminal case.

5. Replace the handstrap retainer pads and phillips-head screws removed in step 2. Tighten each screw securely (slightly more than hand-tight), being careful not to over tighten them. *Overtightening the screws may cause irreparable damage to the terminal case!*

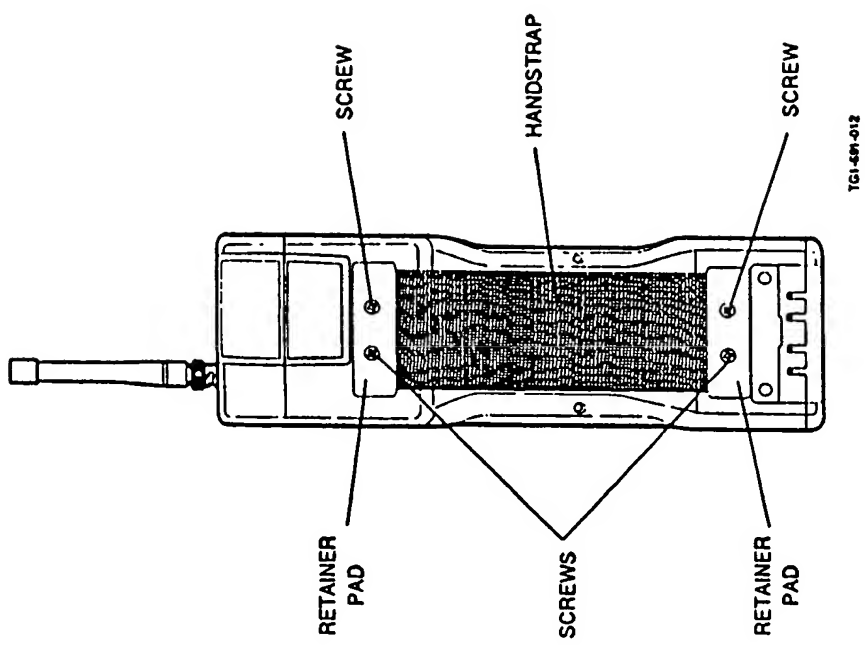


Figure 9
Removing and Replacing the Handstrap

Terminal Antenna Maintenance

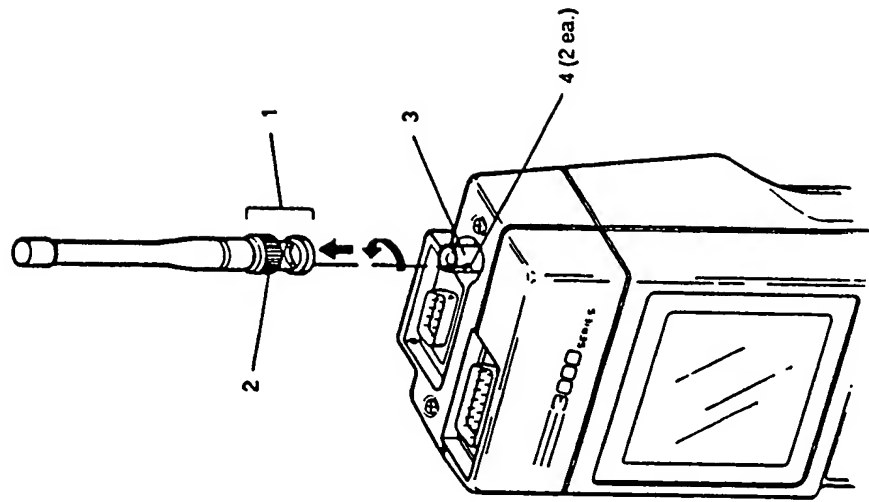
The terminal antenna can also be removed and replaced by the user. Although it is unlikely that the antenna will malfunction or break, it may be convenient to remove the antenna while performing other maintenance on the terminal. The following steps explain how to remove and replace the antenna.

Antenna removal

1. Refer to figure 10. Grasp the terminal firmly in one hand. With your remaining hand, pinch the knurled ring (2) on the antenna BNC connector (1) between your thumb and index finger.
2. While exerting downward pressure on the knurled ring, slowly turn the antenna BNC connector counterclockwise approximately 2/3 of a turn, then release it.
3. Pull up on the antenna, and remove it from the connector (3) on the terminal.

Antenna replacement

1. Refer to figure 10. Align the locking pins (4), located on either side of the terminal connector (3), with the locking pin guide channels on either side of the antenna BNC connector (1); then push the antenna BNC connector onto the terminal antenna connector.
2. Grasp the terminal firmly in one hand. With your remaining hand, pinch the knurled ring (2) on the antenna BNC connector between your thumb and index finger.
3. While exerting downward pressure on the antenna, slowly turn the knurled ring clockwise approximately 2/3 of a turn, then release it. The antenna should be firmly seated and locked into place in the terminal antenna connector.



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Figure 10
Removing and Replacing the Antenna

TROUBLESHOOTING THE 3000 SERIES TERMINALS

When properly maintained and cared for, your 3000 Series Radio Data Terminal should provide trouble-free operation. If a problem should develop, use the following troubleshooting procedures along with those contained in your programmer's guide to isolate the problem. In most cases, these procedures will help you isolate the problem to the terminal or some other component of your network.

the RADIO COMMUNICATION option in the SET PARAMETERS menu) is RTC. If your firmware package is FWP301C5 the communication protocol for your network may be adaptive poll. If this is the case, the terminal will not communicate until the correct protocol is set—reset all the parameters of the terminal to their correct settings.

8. Contact your Norand CSS.

The barcode scanner attached to the terminal does not operate or does not read some of the barcodes.

1. Make sure the terminal has been enabled (from the host computer) for operation with a scanning device.
2. If the terminal is enabled for scanning, attach a known-good scanner to the terminal and try again. If the problem is corrected, replace the defective scanner.
3. Open the PERIPHERAL TESTS menu and select option 5) SCANNER. From the SCANNER MENUS select option 2) TYPE CONNECT (if you have a laser scanner, you must pull and hold the scanner trigger while selecting the type connect option). The terminal display should indicate the type of scanner enabled. If no scanner is enabled or connected, the display will read NOTHING. If the display shows the correct type of scanner has been enabled, press the ENTER key one time then select option 1) SCAN TEST. If the attached scanner does not operate or does not decode the enabled barcodes, contact your Norand CSS.

NOTE

Barcode parameters can be set from the host computer and can override the parameters set on individual terminals. Ensure that the barcode parameters you program into your terminal are not being changed by your host computer or make sure the parameters loaded by the host are correct.

4. Reprogram the barcode parameters for the terminal (refer to page 24 [in Section 2], making especially sure you are enabling the correct types and the correct lengths for each, then repeat step 3.

APPENDIX A TERMINAL SPECIFICATIONS

INTRODUCTION

This appendix contains the specifications for the 3000 Series Radio Data Terminals. Included are the environmental conditions (temperature range, humidity) the terminals can be safely operated in, the environmental conditions required for battery charging, the physical and electrical characteristics of the terminals and terminal battery packs, and a list of devices which can be used to charge the battery packs. Also included are characteristics of the terminal radio.

Radio Data Terminal Specifications

Dimensions

Size:

Length 9.6" (243.8 mm) (excluding antenna)
Width 3.31" (84.12 mm)
Height 1.9" (48.26 mm)

Weight: 32 oz. (0.9 kg)

Environmental Characteristics

Temperature:

Operating: 20 to 110 °F (-6 to 44 °C) (excluding in terminal battery charging)
Storage: -4 to 131 °F (-20 to 60 °C).
Battery Recharging: 41 to 104 °F (5 to 40 °C).

Humidity: 10 to 90% noncondensing.

Altitude: To 10,000 feet (3048 meters) above sea level.

Power Source: Internal Nickel-cadmium battery pack

Backup battery: Lithium cell (for protection of RAM).

Battery Pack Characteristics

Battery type: Nickel-cadmium (Nicad) pack
Capacity: 850 mA-hr

Recharge:

Removed from terminal: 10 hours in an Alexander-type pack charger (1-, 3-, or 6- Pack Chargers).
In terminal: Approximately 12 hours using any of the following:
3950 single dock
3960 multi dock
NC122 Power Supply/Charger
NC120 Power Supply/Charger (requires adaptor)

Standby Holding Charge:

Each charger maintains the batteries at full charge, by supplying a trickle charge, until the batteries or terminal(s) are removed.

Low Battery Indicator:

Last line of screen displays BAT when voltage from the battery pack drops below approximately 6.9 volts (LOW BATT annunciator is lit on 4-line display).

Radio Characteristics

Output Power: 2 watts.

Frequency Range: 450 to 470 MHz.

Antenna: 3.5-inch (8.9cm) stub.

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APPENDIX B TERMINAL MENUS FLOWCHARTS

INTRODUCTION

This appendix contains several flowcharts showing each of the various menus which can be accessed by users of the 3000 Series Radio Data Terminals. The menus shown are present in all terminals with standard firmware packages.

Reading the Terminal Menus Flowcharts

The terminal menus are presented in top-down order. Each menu is accessible only through the menu directly preceding it on the flowchart(s). The first menu shown is the MAIN MENU, as this is the first menu presented when you open the terminal menus (refer to the paragraph *Opening the MAIN MENU* in Section 2 for instructions on accessing the MAIN MENU).

Most of the menus shown have a number in parenthesis () directly above them. This number corresponds to the number that must be selected (in the next higher menu) to open that particular menu. (For example, pressing key "3" when the MAIN MENU is displayed, will open the BEEPER OPTIONS menu. As can be seen in the flow chart, the BEEPER OPTIONS menu has (3) shown directly above it.)

With the exception of the MAIN MENU, when a number in parenthesis is not shown above a particular menu it means that menu will be automatically opened when you exit the menu shown directly above it (this occurs mainly in the BARCODE PARMS menus).

If all of the information for a menu (as shown in the Terminal Menus Flow Chart) does not appear on your terminal display, you can use the up or down cursors (arrow keys) to scroll through the menu.

¹ Some menus which are accessible by the user but are primarily used for diagnostic purposes by authorized Norand Customer Support Centers may not be shown.